

REMARKS

In the Office Action dated December 8, 2009, claims 1-102 were rejected and claims 103-112 were withdrawn from further consideration. In response, Applicant has cancelled claims 1-102 and added new claims 113-132. In view of the above amendments and following remarks, reconsideration of this application is requested.

In the Office Action, original claims 1-102 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite. The Examiner listed numerous clarity issues with the claims. In addition, the Examiner objected to claims 1-102 as using inconsistent terminology. In response, Applicant has cancelled original claims 1-102, and has presented new claims 113-132. Applicant believes it was simply easier and more efficient to cancel the original claims rather than attempt to redraft and correct the numerous issues raised by the Examiner. Applicant believes new claims 113-132 overcome all of the indefiniteness issues previously raised by the Examiner, and accordingly, Applicant requests withdrawal of the 35 U.S.C. §112, second paragraph, indefiniteness rejection of the claims.

In the Office Action, claims 78 and 91 were rejected under 35 U.S.C. §102(a) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as obvious over Heins US 6,733,636. In response, Applicant has cancelled original claims 78 and 91, which thus technically renders this rejection moot. However, Applicant will describe the differences of new independent claim 113 over Heins '636 hereinafter. Accordingly, as the rejection of original claims 78 and 91 is now moot, Applicant requests withdrawal of this rejection by the Examiner.

In the Office Action, claims 1-77, 79-90 and 92-102 were rejected under 35 U.S.C. §103(a) as being unpatentable over Heins '636 in view of Riggs US 4,746,438 or Wiegert US 4,235,715. In response, Applicant once again notes that this rejection is technically moot in view of the cancellation of claims 1-77, 79-90 and 92-102 via the present response. However, Applicant will hereinafter discuss the distinctions of new claim 113 over these three references.

The present patent application, as a whole, is based on the complete removal of multi-valent cations by an ion exchange process, using acid and a decarbonator to remove acidic gases, using a caustic to increase the ionization of ions such as silica, and then feeding an evaporator this stream, which allows it to operate in the scale free, non corrosive environment to provide a high quality distillate for further use.

The Riggs and Wiegert references teach silica removal from the feed stream with an anion exchanger. It is well known in the industry that total dissolved solids (TDS) and silica are to be removed or reduced in boiler feed waters, and Wiegert and Riggs deal with hardness and

alkalinity removal using the processes that have feed streams that contain none or minimal TDS or silica. In contrast, the invention of the present application makes no effort to remove silica and is capable of operating with silica levels in great excess of those typically allowed in boilers, or generally accepted by those skilled in the art, while maintaining a non-scaling and non-corrosive environment.

US 4,745,438 – Riggs

This is a patent for post-treatment of distillate from an evaporator to make the distillate suitable for use as boiler make-up water. By definition, the distillate is already a high quality water that is contaminated with carry-over in the vapour along with non-condensable gasses. Riggs describes use of a SAC or WAC for demineralization and the water has a pH out of the demineralization zone of 3.5-4 on the basis of a resin action after demineralization. Riggs preferably uses an air driven degassifier and uses an ammonium compound to achieve adjustment of the pH. The process of the present invention can be distinguished since it requires a pH in excess of 9 and an ammonium compound would not be used to achieve that.

The process of Riggs would have to be employed after the evaporator of the present invention, and in essence the process would have no real use since all of the hardness ions are removed in the process of this invention and cannot be carried over after the evaporator. The process of this invention uses a mixed bed exchanger, or EDI, these being two processes that are feasible completely to de-ionize the water for high-pressure boiler applications. There would appear to be no real relevance between the invention of the present case, with which deals with highly contaminated waters, and Riggs which is intended to purify pre-defined high quality water.

US 4,235,715 - Wiegert

This patent deals with the removal of alkalinity and hardness from boiler feed waters through the use of deionization and degassing. It does not address silica at all and so it has to be assumed that there is none present in the streams that are to be processed in accordance with the teachings of this patent. Absence of silica in feed waters is typical of prior art processes such as Wiegert's.

Wiegert relates to "waters used as feed to boilers and other industrial applications" and this implies that the water is suitable for a boiler just by removing hardness and alkalinity. The waters treated by the present invention are generally those waters that are exiting an industrial application, be it from boilers, cooling towers, etc. so those waters are not suitable for another boiler to use. They are typically high salinity, high silica, and contaminated with other industrial

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chemicals which are concentrated to minimize blow-down while providing a distillate that could be used as boiler make-up water.

US 6,733,636-Heins

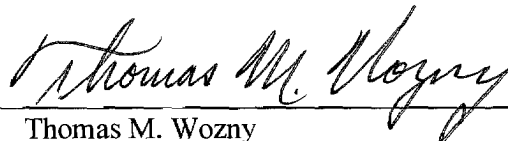
This patent teaches a water treatment method for boiler feed water similar to Applicant's. However, new claim 113 specifically requires that multi-valent metal cations are removed from the feed stream "to a non-precipitating residual level" and further new claim 113 requires "removing substantially all non-hydroxide alkalinity" from the feed water stream. Support for the former limitation can be found in the specification at paragraph 00012 as well as in paragraph 000100, and support for the latter limitation regarding the removal of non-hydroxide alkalinity can be found in paragraph 000100. There appears to be no description in Heins '636 that teaches or suggests that the key parameters are removal of multi-valent metal cations to a non-precipitating residual level as well as the elimination of non-hydroxide alkalinity to the maximum extent feasible. These key steps protect against the precipitation of such salts and the scaling on heat transfer surfaces when operating at an elevated pH of above 9, and preferable above 11, as described in the present invention.

Accordingly, Applicant believes that claims 113-132 are now allowable.

An effort has been made to place this application in condition for allowance and such action is earnestly requested.

Respectfully submitted,

ANDRUS, SCEALES, STARKE & SAWALL, LLP

By 
Thomas M. Wozny
Reg. No. 28,922

Andrus, Sceales, Starke & Sawall, LLP
100 East Wisconsin Avenue, Suite 1100
Milwaukee, WI 53202
(414) 271-7590